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Pattern Analysis and Machine Intelligence, IEEE Transactions on , Volume: 23 , Issue: 8 , Aug. 2001

Pages:829 - 844

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**2 Video to reference image alignment in the presence of sparse features and appearance change***Hirvonen, D.; Matei, B.; Wildes, R.; Hsu, S.;*

Computer Vision and Pattern Recognition, 2001. CVPR 2001. Proceedings of the 2001 IEEE Computer Society Conference on , Volume: 2 , 8-14 Dec. 2001

Pages:II-366 - II-373 vol.2

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### 1. [Outlier detection for high dimensional data](#)

Charu C. Aggarwal, Philip S. Yu

 May 2001 **ACM SIGMOD Record , Proceedings of the 2001 ACM SIGMOD international conference on Management of data**, Volume 30 Issue 2
Full text available: [pdf\(197.25 KB\)](#)
 Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

The outlier detection problem has important applications in the field of fraud detection, network robustness analysis, and intrusion detection. Most such applications are high dimensional domains in which the data can contain hundreds of dimensions. Many recent algorithms use concepts of proximity in order to find outliers based on their relationship to the rest of the data. However, in high dimensional space, the data is sparse and the notion of proximity fails to retain its meaningfulness. ...

### 2. [Data streams I: Clustering binary data streams with K-means](#)

Carlos Ordonez

 June 2003 **Proceedings of the 8th ACM SIGMOD workshop on Research issues in data mining and knowledge discovery**
Full text available: [pdf\(149.75 KB\)](#)
 Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

Clustering data streams is an interesting Data Mining problem. This article presents three variants of the K-means algorithm to cluster binary data streams. The variants include On-line K-means, Scalable K-means, and Incremental K-means, a proposed variant introduced that finds higher quality solutions in less time. Higher quality of solutions are obtained with a mean-based initialization and incremental learning. The speedup is achieved through a simplified set of sufficient statistics and oper ...

### 3. [Clustering: Document clustering via adaptive subspace iteration](#)

Tao Li, Sheng Ma, Mitsunori Ogihara

 July 2004 **Proceedings of the 27th annual international conference on Research and development in information retrieval**
Full text available: [pdf\(181.80 KB\)](#)
 Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Document clustering has long been an important problem in information retrieval. In this paper, we present a new clustering algorithm  $ASI^1$ , which uses explicitly modeling of the subspace structure associated with each cluster.  $ASI$  simultaneously performs data reduction and subspace identification via an iterative alternating optimization procedure. Motivated from the optimization procedure, we then provide a novel method to determine the number of clusters. We also disc ...



**Keywords:** adaptive subspace identification, alternating optimization, document clustering, factor analysis

4 Using approximations to scale exploratory data analysis in datacubes

Daniel Barbará, Xintao Wu

August 1999 **Proceedings of the fifth ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available:  pdf(607.88 KB) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

5 Identify Regions of Interest(ROI) for video watermark embedment with principle component analysis

Roy Wang, Qiang Cheng, Thomas Huang

October 2000 **Proceedings of the eighth ACM international conference on Multimedia**

Full text available:  pdf(271.65 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)


The temporal redundancy of video provides a greater space than images for information hiding at the expense of invitation towards many forms of spatial and temporal attacks, such as frame dropping, frame averaging that are not common in images. With video, the active change of watermark placement location serves as an effective counterattack measure. In this paper, we utilize principal components of joint feature observation of video frames to robustly determine the location of watermark embe ...

**Keywords:** PCA, Principal Component Analysis, Region of Interest, clustering, video watermarking

6 Efficient algorithms for mining outliers from large data sets

Sridhar Ramaswamy, Rajeev Rastogi, Kyuseok Shim

May 2000 **ACM SIGMOD Record , Proceedings of the 2000 ACM SIGMOD international conference on Management of data**, Volume 29 Issue 2

Full text available:  pdf(180.17 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

In this paper, we propose a novel formulation for distance-based *outliers* that is based on the distance of a point from its  $k^{th}$  nearest neighbor. We rank each point on the basis of its distance to its  $k^{th}$  nearest neighbor and declare the top  $n$  points in this ranking to be outliers. In addition to developing relatively straightforward solutions to finding such outliers based on the classical nested-loop join and index join algorithms, we develo ...

7 Solving the occlusion problem for three-dimensional distortion-oriented displays

Donovan Winch, Paul Calder, Raymond Smith

January 2001 **Australian Computer Science Communications , Proceedings of the 2nd Australasian conference on User interface**, Volume 23 Issue 5

Full text available:  pdf(1.60 MB)  Additional Information: [full citation](#), [abstract](#), [references](#)  
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Recent research into distortion-oriented displays (DODs) and non-linear magnification techniques has considered extending their application to large three-dimensional datasets. Inherent properties of three-dimensional datasets introduce some difficulties that do not occur in 2D environments. This paper considers the Occlusion Problem - that of context data hiding, or occluding, some or all of the data within an area of focus. A novel solution to this problem is proposed, namely the use of non-ge ...



# 8 Think globally, fit locally: unsupervised learning of low dimensional manifolds

Lawrence K. Saul, Sam T. Roweis

December 2003 **The Journal of Machine Learning Research**, Volume 4

Full text available:  [pdf\(2.91 MB\)](#) Additional Information: [full citation](#), [abstract](#), [index terms](#)

The problem of dimensionality reduction arises in many fields of information processing, including machine learning, data compression, scientific visualization, pattern recognition, and neural computation. Here we describe locally linear embedding (LLE), an unsupervised learning algorithm that computes low dimensional, neighborhood preserving embeddings of high dimensional data. The data, assumed to be sampled from an underlying manifold, are mapped into a single global coordinate system of low ...

# 9 Learning response time for WebSources using query feedback and application in query optimization

Jean-Robert Gruser, Louiqa Raschid, Vladimir Zadorozhny, Tao Zhan

March 2000 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 9 Issue 1

Full text available:  [pdf\(625.36 KB\)](#) Additional Information: [full citation](#), [abstract](#), [index terms](#)

The rapid growth of the Internet and support for interoperability protocols has increased the number of Web accessible sources, WebSources. Current wrapper mediator architectures need to be extended with a wrapper cost model (WCM) for WebSources that can estimate the response time (delays) to access sources as well as other relevant statistics. In this paper, we present a Web prediction tool (WebPT), a tool that is based on learning using query feedback from WebSources. The WebPT uses dimensions ...

**Keywords:** Data-intensive applications on the Web, Query languages and systems for Web data

# 10 Subspace clustering for high dimensional data: a review

Lance Parsons, Ehtesham Haque, Huan Liu

June 2004 **ACM SIGKDD Explorations Newsletter**, Volume 6 Issue 1

Full text available:  [pdf\(539.13 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

Subspace clustering is an extension of traditional clustering that seeks to find clusters in different subspaces within a dataset. Often in high dimensional data, many dimensions are irrelevant and can mask existing clusters in noisy data. Feature selection removes irrelevant and redundant dimensions by analyzing the entire dataset. Subspace clustering algorithms localize the search for relevant dimensions allowing them to find clusters that exist in multiple, possibly overlapping subspaces. The ...

**Keywords:** clustering survey, high dimensional data, projected clustering, subspace clustering

# 11 Clustering through decision tree construction

Bing Liu, Yiyuan Xia, Philip S. Yu

November 2000 **Proceedings of the ninth international conference on Information and knowledge management**


Full text available:  [pdf\(280.62 KB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

# 12 Data clustering: Opening the black box: interactive hierarchical clustering for



multivariate spatial patterns

Diansheng Guo, Donna Peuquet, Mark Gahegan


November 2002 **Proceedings of the tenth ACM international symposium on Advances in geographic information systems**Full text available:  [pdf\(272.07 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Clustering is one of the most important tasks for geographic knowledge discovery. However, existing clustering methods have two severe drawbacks for this purpose. First, spatial clustering methods have so far been mainly focused on searching for patterns within the spatial dimensions (usually 2D or 3D space), while more general-purpose high-dimensional (multivariate) clustering methods have very limited power in recognizing spatial patterns that involve neighbors. Secondly, existing clustering m ...

**Keywords:** geographic knowledge discovery, hierarchical subspace clustering, spatial ordering, visualization and interaction

**13** Clustering algorithms: FREM: fast and robust EM clustering for large data sets

Carlos Ordonez, Edward Omiecinski

November 2002 **Proceedings of the eleventh international conference on Information and knowledge management**Full text available:  [pdf\(200.82 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Clustering is a fundamental Data Mining technique. This article presents an improved EM algorithm to cluster large data sets having high dimensionality, noise and zero variance problems. The algorithm incorporates improvements to increase the quality of solutions and speed. In general the algorithm can find a good clustering solution in 3 scans over the data set. Alternatively, it can be run until it converges. The algorithm has a few parameters that are easy to set and have defaults for most ca ...

**Keywords:** EM, clustering, data mining

**14** Special issue on independent components analysis: Energy-based models for sparse overcomplete representations


Yee Whye Teh, Max Welling, Simon Osindero, Geoffrey E. Hinton

December 2003 **The Journal of Machine Learning Research**, Volume 4Full text available:  [pdf\(591.75 KB\)](#) Additional Information: [full citation](#), [abstract](#), [index terms](#)

We present a new way of extending independent components analysis (ICA) to overcomplete representations. In contrast to the causal generative extensions of ICA which maintain marginal independence of *sources*, we define *features* as deterministic (linear) functions of the inputs. This assumption results in marginal *dependencies* among the features, but *conditional independence* of the features given the inputs. By assigning energies to the features a probability d ...

**15** Fast detection of communication patterns in distributed executions

Thomas Kunz, Michiel F. H. Seuren

November 1997 **Proceedings of the 1997 conference of the Centre for Advanced Studies on Collaborative research**Full text available:  [pdf\(4.21 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Understanding distributed applications is a tedious and difficult task. Visualizations based on process-time diagrams are often used to obtain a better understanding of the execution of the application. The visualization tool we use is Poet, an event tracer developed at the



University of Waterloo. However, these diagrams are often very complex and do not provide the user with the desired overview of the application. In our experience, such tools display repeated occurrences of non-trivial commun ...

#### 16 Knowledge discovery in data warehouses

Themistoklis Palpanas

September 2000 **ACM SIGMOD Record**, Volume 29 Issue 3


Full text available:  [pdf\(240.77 KB\)](#) Additional Information: [full citation](#), [abstract](#), [index terms](#)

As the size of data warehouses increase to several hundreds of gigabytes or terabytes, the need for methods and tools that will automate the process of knowledge extraction, or guide the user to subsets of the dataset that are of particular interest, is becoming prominent. In this survey paper we explore the problem of identifying and extracting interesting knowledge from large collections of data residing in data warehouses, by using data mining techniques. Such techniques have the ability to i ...

#### 17 Compressed data cubes for OLAP aggregate query approximation on continuous dimensions

Jayavel Shanmugasundaram, Usama Fayyad, P. S. Bradley

August 1999 **Proceedings of the fifth ACM SIGKDD international conference on Knowledge discovery and data mining**


Full text available:  [pdf\(1.12 MB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

**Keywords:** OLAP, approximate query answering, clustering, data cubes, data mining, density estimation

#### 18 Research track posters: Diagnosing extrapolation: tree-based density estimation

Giles Hooker

August 2004 **Proceedings of the 2004 ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available:  [pdf\(378.85 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

There has historically been very little concern with extrapolation in Machine Learning, yet extrapolation can be critical to diagnose. Predictor functions are almost always learned on a set of highly correlated data comprising a very small segment of predictor space. Moreover, flexible predictors, by their very nature, are not controlled at points of extrapolation. This becomes a problem for diagnostic tools that require evaluation on a product distribution. It is also an issue when we are tryin ...

**Keywords:** C4.5, CART, clustering, density estimation, diagnostics, extrapolation, interpretation, modeling methodologies, trees-based models, visualization

#### 19 Poster papers: A unifying framework for detecting outliers and change points from non-stationary time series data

Kenji Yamanishi, Jun-ichi Takeuchi

July 2002 **Proceedings of the eighth ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available:  [pdf\(572.91 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We are concerned with the issues of outlier detection and change point detection from a data stream. In the area of data mining, there have been increased interest in these issues since the former is related to fraud detection, rare event discovery, etc., while the latter is



related to event/trend by change detection, activity monitoring, etc. Specifically, it is important to consider the situation where the data source is non-stationary, since the nature of data source may change over time in r ...

20 Similarity Search: Effective nearest neighbor indexing with the euclidean metric

Sang-Wook Kim, Charu C. Aggarwal, Philip S. Yu

October 2001 **Proceedings of the tenth international conference on Information and knowledge management**

Full text available:  pdf(2.18 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

The nearest neighbor search is an important operation widely-used in multimedia databases. In higher dimensions, most of previous methods for nearest neighbor search become inefficient and require to compute nearest neighbor distances to a large fraction of points in the space. In this paper, we present a new approach for processing nearest neighbor search with the Euclidean metric, which searches over only a small subset of the original space. This approach effectively approximates clusters by ...

**Keywords:** Euclidean metric, high dimensional indexes, multimedia databases, nearest neighbor queries, similarity search

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... readily visualized in two **dimensions**, with clusters .... very high-dimensional, highly



**sparse** customer-product ... attribute values and significant amount of **outliers**.  
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### Readings in OLAP

... and can extend across all **dimensions** and across .... from hypothesis testing and filtering **outliers** during curve ..... memory-based, optimally-**sparse** structures: what is ...  
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of neighbors for each of the likely **outliers**. ..... designed for this situation, and samples **sparse** regions at a .... based technique works well in lower **dimensions** and no ...  
[www.cs.bu.edu/fac/gkollios/icde01.ps](http://www.cs.bu.edu/fac/gkollios/icde01.ps) - [Similar pages](#)

### Voting-Based Computational Framework for Motion Analysis

... of statistically salient features from possibly **sparse** and noisy ..... of the candidate matches - the 3 **dimensions** shown are x .... and we reject the others as **outliers**.

[www.cs.unr.edu/~mircea/Research/Motion/motdata.html](http://www.cs.unr.edu/~mircea/Research/Motion/motdata.html) - 22k - [Cached](#) - [Similar pages](#)

### [PDF] Energy-Based Models for **Sparse** Overcomplete Representations

 File Format: PDF/Adobe Acrobat - [View as HTML](#)

... features is equal to the number of input **dimensions** this energy ... Components Analysis, Density Estimation, Overcomplete Representations, **Sparse** Representations 1 ...  
[www.cs.berkeley.edu/~ywtch/research/ebm/jmlr2003.pdf.gz](http://www.cs.berkeley.edu/~ywtch/research/ebm/jmlr2003.pdf.gz) - [Similar pages](#)

### [PPT] Chapter 32

 File Format: Microsoft Powerpoint 97 - [View as HTML](#)

Unlimited **dimensions** and aggregation levels .... minimize the disk space requirements through **sparse** data management ..... sensitive to the presence of **outliers** (ie., data ...  
[azarbod.cs.mnsu.edu/cs640/DataWarehouse/DataWarehouse-OLAP-3.ppt](http://azarbod.cs.mnsu.edu/cs640/DataWarehouse/DataWarehouse-OLAP-3.ppt) - [Similar pages](#)

### SDSS/Questions on Partitioning

This works for 3 **dimensions**. Find ..... region. It is embedded in a **sparse** cloud of **outliers** - possibly data points with large error. This ...

[tarkus.pha.jhu.edu/~csabai/DB\\_Questions.html](http://tarkus.pha.jhu.edu/~csabai/DB_Questions.html) - 19k - [Cached](#) - [Similar pages](#)

### Washington Statistical Society - 2004 Seminars

... present data and results demonstrating the importance of **outliers**, as well .... in the variables used on one or more **dimensions**, or there are **sparse** tables.

[www.science.gmu.edu/~wss/sem2004.html](http://www.science.gmu.edu/~wss/sem2004.html) - 87k - [Cached](#) - [Similar pages](#)

### The data point of view

... each node and therefore all possible **dimensions** for each ... High dimensional data is often also **sparse** variables. .... **Outliers**: Sometimes it is of interest to include ...

[www.km.lsh.is/datamining/data\\_point\\_of\\_view.htm](http://www.km.lsh.is/datamining/data_point_of_view.htm) - 9k - [Cached](#) - [Similar pages](#)



## Introduction

... Processing Missing Values Removing **Outliers** Regression and ..... Ball An Airflow Model

**Sparse** Matrix Operations ..... Reshaping Permuting Array **Dimensions** Computation with ...

[www.haystack.mit.edu/computing/matlab5.3.1/help/techdoc/using\\_ml/using\\_ml\\_tocframe.html](http://www.haystack.mit.edu/computing/matlab5.3.1/help/techdoc/using_ml/using_ml_tocframe.html) - 51k - [Cached](#) - [Similar pages](#)



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